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ABSTRACT

This paper challenges the characterization of bilingual behavior derived from the code-switching model, and especially the notion of linguistic independence on which psychological studies of bilingualism have focused almost exclusively. While linguists have concentrated on the situational determinants of code-switching, psychologists have focused on the bilingual's ability to keep his two language systems separate. In the process, the phenomenon of code mixing, that is, switching between languages in an unchanged speech situation and within a single sentence, has been neglected. However, recent linguistic studies have shown that the use of both languages in the same discourse and even within a single sentence is quite common. Such code-mixing has been shown to be an effective, versatile communicative strategy, subject to a number of interlingual syntactic constraints. Discussion focuses on some of these constraints, showing that they have implications for a psychological model of bilingual information processing. Emphasis is placed on: (1) their relevance to issues such as the single versus separate storage hypothesis, (2) the language switch model and models of sentence production, (3) the psychological reality of syntactic constituents, and (4) the relationship between language units and thought units. (MES)

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THE SYNTAX AND PSYCHOLINGUISTICS OF BILINGUAL CODE MIXING

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Psychological studies of bilingualism have almost exclusively focused on the so-called "linguistic independence" of the bilingual--i.e., his ability to keep the two languages separate. However, recent linguistic studies have shown that the use of both languages in the same discourse and, in fact, within a single sentence is quite common. Moreover, such Code Mixing (CM) has been shown to be an effective, versatile communicative strategy, subject to a number of interlingual syntactic constraints. In this paper, we discuss some of these constraints and suggest a refinement. We then show that these constraints have interesting implications for a psychological model of bilingual information processing--in particular, for current issues such as the single versus separate storage hypotheses and the language "switch" model, models of sentence production, the psychological reality of syntactic constituents, bilingualism and processing difficulty, and the relationship between language units and "thought units."

1. Introduction

Uriel Weinreich's characterization of the ideal bilingual as an individual "who switches from one language to the other according to appropriate changes in the speech situation (interlocutors, topic, etc.), but not in an unchanged speech situation, and certainly not within a single sentence" (1963:73, emphasis added) seems to have had an enormous impact on the direction of research in linguistics and, especially, in psychology over the last two decades.[1] While linguists have concentrated on the situational determinants of code-switching, psychologists have focussed on bilingual's remarkable ability to keep his language systems separate. In the process, the phenomenon of switching between languages "in an unchanged speech situation" and "within a single sentence" has gone neglected, being considered either a sign of incomplete learning or a pathological condition caused by an impairment of the "language switch" (cf. Penfield and Roberts, 1959) alleged to be located in the area of the Sylvian fissure.[2]

However, recent studies (Clyne 1967, Lance 1970, Gumperz and Hernandez-Chavez 1972, Pfaff 1975, 1976, 1979, Timm 1975, Kachru 1978, Lipski 1978, Poplack 1978, Sridhar 1978, Vaid 1980, and others) have shown that intrasentential switching of languages (Code Mixing or CM here-after) is extremely common among bilinguals. In fact, under certain circumstances (e.g., when all the participants in a speech situation share a bilingual background) CM may be the norm rather than the exception. The studies just cited also show that CM is not random but rule-governed and that it is used to achieve a variety of communicative goals, such as conveying emphasis, verisimilitude, role playing, technical and sociocultural authenticity, and so forth.

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The significance of CM for linguistic and psychological research is obvious. CM raises a host of intriguing questions concerning, e.g., the rules for permissible mixes, the nature of grammatical relationship between the elements of the two languages within the sentence, the interaction of the two rule systems at various stages of sentence production, the implications of CM for the "single" vs. "separate" store hypotheses, for the hypothesized "language switch", for processing difficulty, the status of mixed segments as "thought units", and so forth.

Our aims in this programmatic paper are (1) to present an overview of recent research on the linguistic characteristics of intra-sentential CM; and (2) to explore its implications for a psycholinguistic model of bilingual processing. The linguistic description in the first part sets forth what may be called minimal adequacy conditions that must be met by a psychological theory. Excepting a few pioneering studies such as Kolers 1966a, and Macnamara and Kushnir 1971, the psycholinguistics of CM is a virgin field, but rich in promise. Hence, any discussion of the issues at this stage in research must necessarily be discursive, indeed, largely speculative, rather than experimental. We do believe, however, that asking the right type of questions may at least constitute a beginning.

2. Definitions

Code mixing refers to the transference of linguistic units (words, phrases, clauses, etc.) from one language into another within the same speech situation and within single sentences. It is to be distinguished from the better known term, code switching, in two respects: (1) each instance of language alternation in CM is not accompanied by a shift in the speech situation (unlike in the "ideal" situation described in the quotation from Weinreich, above); and (2) the language alternations take place intra-sententially. CM is also different from borrowing in many ways: (1) the mixed elements do not fill "lexical gaps" in the host language; (2) the mixed elements are often sequences longer than single words; (3) the mixed elements are not restricted to a more or less limited set accepted by the speech community of the host language—on the contrary, the entire second language system is at the disposal of the code mixer; (4) the mixed elements are not necessarily assimilated into the host language by regular phonological and morphological processes; and finally, as Pfaff (1979:295) rightly observes, (5) the two terms make totally different claims about the competence of the individual speaker: borrowing can occur in monolingual speech, while code mixing is necessarily a product of bilingual competence.

A further set of terms crucial to any discussion of code-mixing may be proposed. These refer to the primary language of the discourse (referred to as the host language hereafter) and the source language of the mixed elements (the guest language). As Wentz (1977) shows, despite extensive mixing of elements from another language, speakers and listeners usually agree on which language is being spoken in a given sentence or discourse.

3. Categories of Elements Mixed

Consider the following examples. (The examples cited, except where indicated, come from the present authors' observations of Kannada-English

bilingual speech in informal conversations.)

(1) nam tande airport-ge hōgiddāre.
(My father has gone to the airport.)

(2) avaru committee chairman āgōdu nanage iṣṭa illa.
(I don't like his becoming the committee chairman.)

(3) And from there I went to live pa mucho sitios. (. . .in a lot of places) (Poplack 1979)

(4) El hombre who saw the accident es Cubano.
(The man. . .is Cuban) (Gingras 1974)

(5) The type of work he did cuando trabajaba (when he worked) he. . .what. . .that I remember era regador (he was an irrigator) at that time. (Gumperz and Hernandez-Chavez 1972)

(6) Fui a cash su cheque. (I went to cash his check) (Pfaff 1975)

(7) No van a bring it up in the meeting.
(They're not going to. . .) (Pfaff 1975)

(8) avaru hīge mādiyāru anta I had no idea.
(That he would do this, . . .)

Although elements from practically every syntactic category (including purely grammatical morphemes such as determiners) occur in code mixed sentences, it has been found that certain types of elements are more likely to be mixed than others. In general, except for single words especially nouns, the higher the constituency of the element, the more likely it is to be mixed: thus, conjoined sentences, main clauses, subordinate clauses including relative clauses, major constituents such as noun phrases, verb phrases, and prepositional phrases are among the most frequently mixed elements. Among single words, nouns outrank all others in frequency of mixing, followed by adjectives, adverbs, and verbs. Grammatical items such as articles, quantifiers, auxiliaries, prepositions, and clitics are least likely to be mixed by themselves. These generalizations were confirmed in a recent study of the recorded speech of Puerto Ricans in New York City by Shana Poplack, who found the distribution of code mixed elements as shown in Table 1.

4. Probability vs. Grammaticality of CM

The observation that certain types of syntactic elements or constituents are more likely to occur in mixed sentences than others is only an initial indication of the possibility that CM is not a random but a patterned phenomenon. More direct evidence pointing to the existence of a "grammar of code mixing" comes from a variety of studies, based on bilingual speakers' (1) judgements of the grammaticality/acceptability of various types of mixed sentences (Lance 1970, Gingras 1974, Timm 1975, Wentz 1977); (2) normalizations or regularizations of mixed sentences in repetition tasks (Wentz 1977); and (3) self-corrections in spontaneous speech (Timm 1975).

Table 1: Intra-sentential (Spanish to English) code-mixing by syntactic category (Based on Poplack 1979:45)

Syntactic Category of Mixed Elements	No. of Mixes	% of Total Mixes
Clauses	58	12
Noun Phrases	103	22
Phrases (Prep., Adj., Adv., & Infin.)	39	8
Verb Phrases	13	3
Single Nouns	141	30
Single Adjectives	49	11
Single Adverbs	33	7
Single Verbs	13	3
Conjunctions (subordinate, coordinate, relative pronouns)	16	3
Auxiliary, preposition, determiner	0	0
Total	465	

For example, Gingras (1974) found that members of a bilingual community display an impressive degree of agreement on the judgements of acceptability of code mixed sentences. The following is a sample of sentences judged acceptable by nearly all of his 38 Chicano informants (the exact percentage of acceptance is given in parentheses).

(9) The man que vino ayer (who came yesterday) wants to buy un carro nuevo (a new car). (92%)

(10) The hombre viejo (old man) is mad. (90%)

(11) El old man esta enojade. (The old man is mad.) (94%)

(12) El hombre who saw the accident es Cubano. (The man. . . is Cuban.) (100%)

The informants were equally consistent in rejecting the following sentences as ill-formed.

(13) El hombre old esta enojado. (The old man is mad.) (0%)

(14) El man old esta enojado. (ibid) (5%)

(15) El man viejo esta enojado. (ibid) (5%)

(16) El man que came ayer wants John comprar a car nuevo. (The man who came yesterday wants John to buy a new car.) (0%)

The above set of examples shows that we must look beyond probability in explaining the acceptability status of code mixed sentences. Besides the as yet little studied "stylistic" and "social meaning" variables, perhaps the most important determinant of acceptability in CM is the strucural compatibility of the host and guest language items. We shall take a closer look at this next.

5. Integration of Guest Elements in Host Structures

It might appear at first sight that mixing of single elements such as nouns, verbs, and adjectives is a psycholinguistically simple process. Thus, in the Kannada sentence,

(17) Ramu office-ge hōgidāne.
Ramu office-to gone-has
Ramu has gone to office.

it may be supposed that office is substituted for the Kannada word, kachēri. If this is correct, then mixing of single elements from another language is not different, in principle, from the process involved in the choice between synonyms in the same language, e.g., between carcinogenic and cancer-causing (cf. Paradis 1977). Even single elements, however, involve much more complex processes of integration than this. Certain lexical items simply cannot be mixed because of restrictions in the host language. A case in point is the impossibility of using no one in a sentence in Tamil--or any Dravidian language--because of the absence of the rule attaching the negative to the quantifier in the host language (Annamalai 1971). Thus, while the Tamil sentence (18) is grammatical, (19) is not:

(18) meeting-kku yaarum varale.
*Anyone didn't come to the meeting.

(19) *meeting-kku no one vandaanga.
No one came to the meeting.

Thus the semantic composition necessary for lexical mapping may itself be unavailable.

Even in cases of perfect lexical congruence between the guest item and its host language counterpart (e.g., blanca and white in Spanish and English), the language-specific constraints on the surface structure placement of the items may bring about structural conflicts. A well-known case in point is the placement of Spanish and English adjectives in mixed sentences (Pfaff 1979). Adjectives normally precede the noun in English except in certain specific structures (e.g., when preceded by an adverb) and follow the noun in Spanish when they are members of a closed set (e.g., possessives, ordinals, and other limiting adjectives). It is interesting to note that when adjectives occur in code mixed sentences, they obey both these constraints. Thus, Spanish adjectives occur preposed in English sentences if they are members of the closed set:

(20) mi grandma (my grandmother)

(21) el siguiente play (the following play)

And English adjectives occur post-nominally in Spanish if they are preceded by adverbs:

(22) Me lleve chile ya roasted y peeled. . .para hacerlo alla. (I picked up the chile already roasted and peeled for making it there.)

(23) ese color como muy dark maroon (that color like very dark maroon).

What this constraint implies, in "process" terms, is that the speaker monitors the surface structure of the host sentence to ensure its compatibility with the structural constraints inherent to the guest item. In other words, not only the lexicons but the entire rule systems of both languages must be simultaneously active in the production of mixed sentences.

Linguists describing code mixed language types have proposed a variety of such substantive constraints to account for the occurrence and non-occurrence of certain types of mixes (Gingras 1974, Gumperz 1970, Kachru 1978, Lipski 1978, McClure and Wentz 1976, Pfaff 1975, 1976, 1979, Poplack 1978, 1979, Sridhar 1978, Timm 1975). The various proposed constraints (e.g., Gumperz's constraint on the mixing of auxiliary verbs, Timm's constraint on the combinability of host finite verbs and guest infinitive complements, and so on) are continually being challenged and modified on the basis of new data (see Wentz 1977, Lipski 1978, and Poplack 1978 for details). While research on such constraints goes on, there does seem to be wide support for at least one general constraint which subsumes a number of specific constraints suggested earlier. Two versions of this constraint, developed independently by Poplack (1979) and Lipski (1978), are given in (24) and (25) below:

(24) The Equivalence Constraint: Code-switches will tend to occur at points in discourse where juxtaposition of L_1 and L_2 elements does not violate a syntactic rule of either language, i.e., at points around which the surface structures of the two languages map on to each other (Poplack 1979:10-11).

(25) Hypothesis B (Informal Version): Whereas the portion of a code-switched utterance that falls before the code-switch may indeed contain syntactically divergent elements, those portions falling after the switch must be essentially identical syntactically. (Lipski 1978:258)

Although, in our opinion, the two constraints do go a long way toward capturing the essential syntactic principle involved in code-mixing, there is, however, one problem shared by both the proposed constraints. This is lack of specification of the internal constituency of the switched element in Poplack's constraint, and the vagueness associated with the hedge "essentially" in Lipski's hypothesis. (The hedge is absent from his formal version.) Although Poplack claims that the surface structures of the two languages must map on to each other at the point of the switch, she does

not specify what degree of correspondence must obtain for two structures to be considered equivalent. In her example, repeated below as (26),

(26)

Eng.	I	told him	that	so that	he	would bring it	fast
Sp.	(yo)	le dije	eso	pa' que	(él)	la trajera	ligero
Mixed	I	told him	that	pa' que		la trajera	ligero

although told him and le dije on the one hand and would bring it and la trajera on the other are equivalent at a certain level of analysis, they do, of course, differ with regard to the order of elements within the constituents, and to that extent, they are not equivalent. Thus, strictly speaking, the ordering rules in the verb phrase in both the main and the subordinate clause are violated in the mixed sentence.

The problem with Lipski's formulation of the constraint is similar. He uses the qualifier "essentially" with his version of the identity or equivalence constraint because of examples of well-formed mixing where the internal constituency of the mixed element differs from that of its unilingual translation equivalent. Consider his example (17a) repeated below as (27),

(27)

Mixed:	No sé, porque I never used it.
Eng.:	I don't know, because I never used it.
Sp.:	No sé, porque nunco lo usé.

where, except for the placement of the clitic pronoun in Spanish the mixed and the Spanish segments are essentially identical following the switch.

A solution to this problem might be to incorporate into the proposed constraint the Dual Structure Principle first put forward in Sridhar (1978). A revised version of this principle is given in (28):

(28) Dual Structure Principle. The internal structure of the guest constituent need not conform to the constituent structure rules of the host language, so long as its placement in the host sentence obeys the rules of the host language.

Consider the following case. The noun phrase in English consists of a head noun, and optionally, prenominal modifiers such as determiners, adjectives, etc., and post nominal modifiers such as prepositional phrases, relative clauses, sentential complements, etc. In contrast, the noun phrase in Kannada can have only prenominal modifiers, even relative clauses and sentential complements occurring pre-nominally in the language. Now, according to the Dual Structure Principle, English NPs with post nominal modifiers can be code mixed in Kannada, although they are formed in violation of the constituent structure rules for NPs in Kannada, as long as the English NPs occur in positions normally occupied by NPs in Kannada sentences. This principle is illustrated in the following sentence:

(29) avanu obba man of considerable courage.
(He is a man of considerable courage.)

This principle is illustrated even more dramatically in sentence (30):

(30) nanna abhiprayadalli his visiting her at home sariyalla.
my opinion-in proper not
(In my opinion, his visiting her at home is not proper.)

Consider the italicised segment above with its Kannada counterpart:

(30a) avanu avalannu mane-yalli nōḍuvudu
he her home-in visiting

Note that the English segment is different from the Kannada version in four important respects: (1) the English subject is marked with possessive ending while the Kannada subject is nominative; (2) the verb in English precedes the object while the Kannada verb follows its object; (3) the locative is a preposition in English and a postposition in Kannada; and (4) the adverbial phrase (at home) follows the object in English, while it precedes the verb in Kannada. Thus, it is obvious that the internal constituency of the mixed element is autonomously generated by a separate set of rules and that the really crucial constraint concerns only its external relationship with the elements of the host sentence.

6. Psycholinguistic Implications

The preceding discussion of some of the major syntactic properties of CM suggests a number of implications for a psychological model of bilingual information processing.

As noted earlier, the focus of psychological research on bilingualism has been the so-called "linguistic independence" of the bilingual, i.e., his "feat of separate storage, retrieval, and processing" (Macnamara 1967: 67). In order to explain this linguistic independence, Penfield and Roberts (1959) proposed the theory that the neurological mechanisms of the two languages of the bilingual are organized in such a way that when one is on, the other must be off. However, as we have noted above, CM involves simultaneous interaction of the two rule systems in the production of a single sentence. Not only are elements from two languages present in the same sentence, these elements are integrated into a unified syntactic structure by a complex interaction of constraints. Thus, CM requires both systems to be on at the same time, thereby rendering unlikely any strong version of the language "switch" hypothesis.

This conclusion is consistent with a number of recent experimental studies demonstrating interlingual "interference" or "facilitation" in bilingual processing (Kolers 1966b, Darlymple-Alford 1968, Young and Naver 1968, Preston and Lambert 1969, Segalowitz and Lambert 1969, Meyer and Ruddy 1974, among others). These studies show that the activation of one language system in the bilingual does not necessarily render the other system inoperative.

Yet, this does not mean that the two systems are 'merged' in the bilingual. After all, even habitual code mixers do produce entirely monolingual discourses in each of their languages when the occasion demands it (e.g., when speaking to a monolingual). Also, even in conversations that seem to be in mixed speech, speakers produce a high proportion of turns speaking entirely in one language or the other (Pfaff 1979:293). The right

approach, therefore, seems to be to avoid both the strong linguistic independence model and the merged system model in favor of an interactionist model of overlapping systems. The crucial question, of course, is how the overlap is accessed in CM.

The existence of interlingual constraints such as the Equivalence Constraint and the Dual Structure Principle seems to indicate the need for positing a comparison stage in the production of mixed utterances (cf. Clyne 1967, Rayfield 1970, Lipski 1978). At this stage the bilingual speaker checks the external patterning or the syntactic compatibility of the guest element with the host sentence. However, it is unlikely that the speaker produces (even subliminally) two entire "utterances", one in each language, before making the comparison, as Lipski (1978:263) seems to suggest: Far more likely is the possibility that mixed sentence production involves an "assembly line" process, where individual components (guest constituents) are put together separately and inserted into appropriate slots in the syntactic frame of the host language. It is perhaps only the syntactic constituency of the guest constituents and their external patterning with the host sentence that is checked at the comparison stage.

A very important issue in the psychology of CM is whether CM adds to processing difficulty. Kolers (1966a) found CM to be irrelevant for comprehension but inhibitory for production: A "switching time" of 0.3 - 0.5 seconds was found for reading aloud mixed passages, and about 1.3 seconds for free speech and making precis in mixed language. Kolers attributes the longer switching time in the latter conditions to the need to make "decisions about what to say and about when and how to mix his speech" (p. 372). Macnamara and Kushnir (1971) found a mean switching time for input close to 0.2 sec, in tasks involving silent reading, and true/false judgment of visually and orally presented code mixed material. A similar mean switching time of close to 0.2 sec, was found for output in an independent study of number naming by Macnamara, Krauthammer, and Bolgar (1968). All this cumulatively seems to confirm that language switching (or mixing) "takes an observable amount of time."

This conclusion must be evaluated in light of the following observation: in the mixed passages employed in the Kolers study, words were "haphazardly in English or French, half the passages favoring English word order and the other half favoring French" (Kolers 1966a:358). It is possible, therefore, that the extra processing time was due, in part at least, to the ungrammaticality of (some of) the sentences (i.e., in terms of the norms of CM). This criticism applies equally to the Macnamara and Kushnir study, because some of their passages were those used in Kolers' study and the others also seem to have been put together rather mechanically. However, this does not explain the strong evidence for switching time found by Kolers in the "free speech" condition.

Assuming that this observed switching time may be replicated in other naturalistic sentence processing tasks with appropriate syntactic controls, it is interesting to speculate further on the extent and cause of the extra processing time. First of all, the switching time of approximately .20 sec, is, as Macnamara, Krauthammer, and Bolgar (1968) observe, little over the minimum threshold of speed for language operations observed by Lenneberg (1967). Second, as the same authors note, the more regular the switch,

the less time it takes, and there is evidence that CM is a rule governed phenomenon, although the rules have only just begun to be discovered. Third, Kolers (op. cit.) found that practice reduces switching time, and CM is a stable, habitual mode of language use--a full-fledged code in the bilingual's repertoire like any other code. These considerations suggest that the processing difficulty involved of code mixed sentences may be very small, even if real.

The preceding discussion of switching time refers, of course, to what Kolers has called the "phonological" switching time (and the corresponding "auditory" switching time in comprehension). It will be recalled that the actual switching time in free speech was much greater, an increase attributed by Kolers to the "cognitive cost of switching" (p. 365). A factor contributing to this cognitive cost may be the Dual Structure Principle, requiring interaction of two separate sets of syntactic rules in the production of the same sentence.

Another interesting issue in the psycholinguistics of CM is the status of mixed elements as units in sentence planning. An attractive hypothesis about sentence planning is that the "idea" or the message underlying a sentence is put together in chunks of various sizes or degrees of complexity, each chunk functioning as a unit at a particular level (cf. Sridhar 1980). Transitions from one language to another, then, could occur between chunks. Thus, it is intuitively appealing to consider noun phrases, relative clauses, subordinate clauses of all kinds, prepositional phrases, etc., (or, strictly speaking, the "meaning" of such constituents) as "good" chunks--or internally coherent thought units--whereas certain other combinations would not so qualify, e.g., two function words, a preposition and an article. This could be translated into testable predictions about a) what kinds of elements and combinations would be mixed, and b) what kinds of mixing would be comprehended faster.

In the only relevant study in this area, Kolers 1966a found that the majority of prepositional phrases in mixed spoken precis were unilingual, but if the unit is mixed, article and noun are more likely to be in the same language than preposition and article (368). This seems to suggest that while preposition phrase may be a syntactic unit, noun phrase may be a more basic conceptual unit. However, in the next task (reading aloud of mixed passages), Kolers found subjects "translating" elements of preposition phrases, invariably into the language of the immediately preceding word, either within that unit or outside of it. This produced some cases where the preposition and article were in one language and the noun in the other (370), leading Kolers to conclude that there is no linguistic unit larger than the word whose boundaries are not permeable (375). Two observations may be made about this conclusion: First, the "interference" due to contiguity observed in the second task may be specific to reading and may not be generalizable to spontaneous speech, therefore the permeability of syntactic boundaries in reading aloud may not be conclusive evidence regarding their status as 'thought units' in sentence production. Secondly, Kolers analyzed the data from the perspective of the host language--and the integrity of its constituent structure boundaries. It would be equally interesting to examine the internal structure of the guest segments, to see whether they can be considered 'thought units'. A number of constraints against the mixing of single function words such as determiners (Gumperz

and Hernandez-Chavez 1972), conjunctions (Kachru 1978), auxiliaries (Timm 1975), and others have been proposed, which, if they survive the attacks on the basis of putative counter-examples, would support the usefulness of exploring the status of the mixed elements as representing units of thought.

7. Conclusion

We have tried to show in this paper that Code Mixing is an exciting and promising field of research both in syntax and psycholinguistics, and especially when the two orientations interact. Besides its acknowledged sociolinguistic importance, this phenomenon raises a host of intriguing issues such as defining cross-linguistic formal and functional equivalence, universal constraints on mixability of categories and structures, the mental representation and interaction of cognitive systems, the processing complexity of bilingual performance, and the psychological status of linguistic structures as thought units, among others.

As noted already, much of this study has been speculative. This is unavoidable, given (1) the almost total neglect of CM by psychologists, and (2) the rather primitive nature of current psycholinguistic models of bilingual information processing. It is no exaggeration to say that except in the couple of studies discussed above, syntax has been a stranger to the psychology of bilingualism. The experimental paradigms have been either naive (indiscriminate mixture of elements from two languages) or quaint (reciting the alphabet backwards). The pressing need in psycholinguistic research on bilingualism is the study of sentential processing, designed with adequate syntactic controls. Preferably, such studies should involve languages which are typologically different from one another. The study of Code Mixing is an area where such paradigms and controls are not only desirable but essential.

NOTES

[1]This is a prepublication version of an invited paper to appear in the Canadian Journal of Psychology, Special Issue on Bilingualism, edited by Paul Kolers and Michel Paradis, 1980. We would like to thank E. Annamalai, Braj Kachru and Jyotsna Vaid for their illuminating discussions on this topic. Requests for reprints should be addressed to S. N. Sridhar, Linguistics Program, SUNY - Stony Brook, NY 11794.

[2]Although this possibility was seriously entertained at one point (cf. Weinreich 1963:72), a recent comprehensive review of bilingualism and aphasia (Paradis 1977) found little evidence or need to posit a specifically bilingual switch mechanism localized in the brain (88-91).

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